

Groundnut Farming

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Introduction

Groundnut, popularly known as the peanut is a leguminous crop cultivated for edible purposes. It is found exclusively in tropical and subtropical regions of the world. It is sometimes considered as a grain legume because the seed can produce oil and the crop is categorized as an oil crop. The oil content in the seed is estimated to be around 44-50%. The useful part or the part of economical importance within the crop grows under the ground as pods. These crops contain nitrogen fixing bacteria in their roots and that is the reason behind their low nitrogen fertilizer requirement. The cultivation of groundnut began from a hybrid of two different species of groundnuts found in the wild. They are *A. duranensis* and *A. ipaensis*.

Major uses of groundnuts are found in soap making, cosmetics, lubricant industries, etc. The cake of groundnut is used for manufacturing artificial fiber. The green or dried leaves of the groundnut crops are called haulms and are used as livestock feed. The shell of the ground nut is used for manufacturing coarse boards, corks etc. This groundnut farming project report highlights the details about the farming techniques and at the end one can find the details about the cost of groundnut farming and the profit associated with 1 hectare of land.

Scope and Importance of Groundnut Farming

Among the oilseed crops grown in India, groundnut holds the first place. The annual production of groundnuts is around 7180.5 thousand tonnes approximately and 9 states are considered to contribute more than 100 thousand tonnes each. The major groundnut producing states in India are Gujarat, Rajasthan, Tamil Nadu, Andhra Pradesh, Karnataka, Madhya Pradesh, West Bengal and Telangana. Groundnut farming in India is done in 85 lakh hectares of land approximately and highest productivity is from the state of Tamil Nadu. Oil seeds in India definitely contribute to the agricultural economy, but they are only next to food grains in both value and production. The importance of edible oil in one's daily diet has resulted in increased demand for groundnut production. It is estimated that there would be further increase in consumption levels owing to enhanced income and population. Currently the production doesn't satisfy the demand and oil is being imported from other countries. Therefore, efforts should be made to increase the area under production for groundnuts so that many by-products manufactured from these could be made available. Groundnut farming in India is also expected to improve income opportunities for the tribal population.

Cultivars/Varieties of Groundnut

All the varieties of groundnut can be divided into three main subcategories namely; the bunch or the Spanish variety, the semi-spreading or Virginia bunch variety and the spreading or Virginia runner variety.

Bunch variety

- Plants are erect
- Light green foliage
- Pods are produced in clusters

- Seeds are round, plump and non-dormant
- Seed colour is light rose
- Examples of this variety are Ah.32, Junagadh-II, GAUG-1, Kadiri-71.1, TMV-2, pol.1. pol.2, AK.12-24, Kopergoan-3 etc.

Semi- spreading variety

- Partial trailing branches
- Pod production along the branches
- Dark green colour foliage Oblong, dormant and brown seeds
- Some examples of semi spreading varieties are TMV-6, TMV-8, Kopergoan-1, C-501 etc.

Spreading variety

- Completely trail along the surface of soil
- Have dark green foliage
- Seeds are oblong and dormant
- Some examples of spreading varieties are Punjab-I, Ah.334, GAUG-2, TMV-3, Karad 4-11, M-145, M-13 etc.

The semi-spreading and spreading varieties have heavy yield characteristics and late maturing property.

Plant and Produce Properties

Groundnut is considered to be a self pollinated crop, which can grow to a maximum height of 30 to 50 cm. The leaves of the plant are opposite and pinnate. They have four leaflets, each 1-7 cm long and 1-3 cm broad. The colour of groundnut plant flower is yellowish orange with red veins, generally grown in clusters and last for one day. The pods of peanut or groundnut grow underground and this feature is termed as geocarp. The base of the ovary has a short stalk which elongates upon fertilization and forms a thread like structure called the peg. The peg grows inside the soil and the tip of the ovary develops into a peanut pod. The average length of a pod is 3-7 cm and may contain 1 to 4 seeds. The groundnut has 5 parts; they are shell, cotyledons, seed coat, radical and plumule.

- Mono and polysaturated fat made up of oleic and linoleic acid
- Proteins like arachin and conarachin
- Have low carbs and high fibre content
- Contain vitamins and minerals like biotin, copper, niacin, folate, manganese, vitamin E, thiamin, phosphorous, magnesium.
- Some extra bioactive and antioxidant compounds present in it are p-coumaric acid, resveratrol, isoflavones, phytic acid, phytosterols etc.

Soil and Climatic Conditions for Groundnut Farming

Groundnut plants need well drained sandy loam or clay loam soil for better performance. The soil should be deep and the pH of the soil should be around 5.5 to 7 with high fertility index. It is observed that heavy soil is unsuitable for cultivation because of difficulty in harvesting and pod loss. The soil should not be saline in nature because these crops are sensitive to salt. The soil for groundnut farming should not have stones and clay otherwise the yield would

be affected. The temperature of the area should be around 27-30°C for good germination and growth. The minimum annual rainfall required for the crops is in between 450 to 1250 mm. High altitudes, cold and frost are not suitable for groundnut farming. Exclusively long warm climate is good for cultivating groundnuts.

Land Preparation and Planting for Groundnut

All the previous crop residues and weeds should be removed and first ploughing to a depth of 15-20 cm should be done. This should be followed by 2-4 cycles of disk harrowing for getting a fine tilth of the soil. There are three systems developed for sowing groundnuts; the flat surface system, the broad bed-furrow system and the ridge-furrow system. The advantage of the broad bed furrow system is that it helps in proper draining of water, retains soil moisture, provides aeration to the soil and facilitates for intercultural activities.

Depending on the variety of the groundnut seed, the sowing rate is decided. For bunch type crops 3, 30,000 plants/hectare with 30 x 10 cm spacing is possible. Similarly for crops that belong to the spreading variety 2, 50,000 plants per hectare with 40 x 10 cm spacing is possible. Before sowing, the seeds are treated with proper chemical fungicides so as to control the diseases caused by pathogens.

The seeds are sown at a depth of 5-6 cm in the soil and it is lightly pressed to keep the moisture intact so that there is a uniform and fast germination. The temperature of the soil for sowing should be around 18°C. The most suitable row and plant spacing should be 90 cm and 4-7 cm respectively under rain fed conditions. If it is an irrigation dependent area, then the spacing between rows should be 30 to 35 cm. The minimum no. of seeds required for planting in 1 hectare of land is 100 to 160 kgs.

Propagation of Groundnut

Groundnuts are propagated through seeds. The seeds should be shelled just two weeks before planting. Groundnut seeds are either grown in the nursery, then transplanted to the main area or they have directly sown in the main field. The seeds are sensitive to physical damage so they should be handled carefully. It is important to note that split or damaged kernels will never germinate, so high quality seed should be procured for planting. The seeds for planting should have been naturally dried. If naturally dried seed are not available then, artificially conditioned seeds could be used, but excess heat application to dry the seeds can impair their germination property. Seeds dried under the sun are also considered to have poor germination.

When seeds are used for farms, then treating them with fungicides and doing a Rhizobium culture is highly important. There should be a gap of a week or 10 days between the two treatments. The seeds for 1 hectare of land may need 1.5 kgs of Rhizobium culture.

Manure and Fertilizer Requirements for Groundnut Farming

Residual soil fertility is essential while cultivating groundnuts. This is obtained by growing non-leguminous crops prior to groundnuts and fertilizing them properly with potassium and phosphorous content. The soil is tested and then required amount of fertilizers are added, but the general recommendations for groundnut crops are FYM @ 10 to 12 tonnes per hectare should be supplied to the soil 25-30 days before sowing. The plants may need micronutrients like nitrogen @ 8-20 kg, phosphorous @ 16-80 kg and potassium @ 1-75 kg per hectare of land as a basal application. Calcium helps in good seed development in groundnut plants and is supplied during the flowering stage @ 200-400 kg per hectare.

Other than these the crops may need micronutrients like boron @ 3-4kg/ha during land preparation, zinc @ 10-20 kg/ha once in three years during soil preparation, sulphur and iron.

Irrigation Facilities

The period from flower development to pod formation needs a moist upper soil surface for a better yield. Improper water supply can reduce the growth rate of the crops, reduce the pod development and pod yield. The main idea of irrigation is to keep the soil surface moist without water-logging problems. If the crops are grown in a rain fed region, then there should be proper arrangement for drainage such that excess water doesn't stagnate in the field. If any extra irrigation is required it should be given only at flowering, pegging and seed development stages.

If the crops are grown as Rabi or summer crops, then one should depend on irrigation. The total amount of water required by a groundnut crop is around 600-650 mm. Generally the crop should have 2-3 weeks of moisture stress which should be followed by frequent irrigation; doing so helps the crops flower profusely and have a uniform pod maturity. At different stages like seed development, pod formation and pegging light irrigation is given. When the crops have grown completely and are nearing maturity, irrigation should be reduced otherwise there is a risk of diseases. Flood irrigation is not suitable for groundnut plants instead sprinkler irrigation should be provided.

Intercultural Activities of Groundnut Farming

Earthing up of soil should not be practiced for groundnut plants otherwise the pod formation of the lower highly productive nodes is affected. It can also result in deformed plants and non-flowering of the crop.

Intercropping is practiced while growing groundnuts during the initial years and the crops that are generally intercropped are pigeon pea, sunflower and some cereal varieties.

Groundnuts are often cultivated in rotation with non-leguminous crops so that the yield increases and there are fewer occurrences of diseases. Crops preferred for crop rotation are maize, pearl millet, sorghum, etc.

Groundnut crops are considered as nitrogen fixers because they have the ability to fix 60 to 70% of its nitrogen requirement from the atmosphere under appropriate conditions. For this to happen, groundnut is inoculated with a suitable strain of Rhizobium bacteria.

After the first 3- 6 weeks of sowing, weeds growing around the crop should be removed because groundnut cannot compete with weeds. Any method like mechanical hoeing, manual weed removal or chemical sprays can be used to remove weeds. Using a pre-emergence weedicide followed by manual weeding is considered the best practice. Weeding is done 2 or 3 times during the entire crop cycle; once before flowering season and the other two during pegging. Taller weeds can be manually removed at any stage of the crop cycle.

Pest and Disease Control in Groundnut Farming

The major diseases found in groundnut crops are rust, early and late leaf spots, collar rot, aflatoxins and peanut bud and stem necrosis. These can be controlled by using disease resistant varieties, practicing proper cultural methods, using chemical formulations and biological measures.

The major insect pests that infest the groundnut crops are tobacco caterpillar, gram pod borer, red hairy caterpillar, etc. Some integrated pest management ways to control the pests are growing resistant varieties of crop, growing trap crops like sunflower and castor bean on the borders of the farm, removing the eggs of insect pests manually, allowing

birds to feed on the larvae of insects, applying neem seed oil or powder. There are also chemical insecticides and pesticides available in the market to control these pests.

Some other pests found in groundnut crops are leaf minor, aphids, thrips, jassids, white grub and termites.

Harvesting and Yield of Groundnut Farming

Groundnut crops are considered to be indeterminate crops and the pod maturity is not uniform. For best harvest the farmer should observe the farm regularly. Every cultivar has a different maturity period and the indications of maturity are defined by pod colour, seed colour, leaves and prevailing weather conditions. Inner walls of the pod appear dark brown and if 75% of the pods show this then it is understood that the crops are ready to harvest. The seed inside the pod is white when young and changes to pink colour upon maturity. The leaves of the crop turn yellow and become dry at the tips indicating maturity of the crops.

Harvesting can be done either mechanically or manually. Manual harvest should be done carefully, otherwise there is a risk of destroying the pods or losing them in the soil. A blade is used to sever the taproots below the soil to a depth of 10 to 15 cm. They are then collected and stacked in bunches. For bunch type groundnuts pulling them from the soil is the best method, whereas for spreading type groundnut plants blade harrow is used. The collected bunches are left for four or five weeks before being picked.

The average yield of spreading type groundnut crops is estimated to be 1500 to 200 kg/ha and that of bunch type groundnut is expected to be 1000 to 1500 kg/ha.

Post Harvest Management of Groundnut Farming

Picking is the process of removing the pods from the plants. Then the pods are cleaned and fed into the Sheller, which removes the shells of the groundnut.

Sorting should be efficiently done to remove unwanted dirt, stones, split seeds, foreign materials, weed seeds etc. from the groundnut. They are graded according to the size of the seed and the color. All the sorted groundnuts are tested for the aflatoxins content and should meet the required standards. Once sorting is done, they are graded in terms of Class A, B, C, D and E. The pods that are stored should contain less moisture around 9% only. Groundnuts are unshelled and then stored. Seeds that are used for cultivation should be stored for seven or eight months. Packaging the graded groundnuts should be done in clean, dry, odorless and strong containers.

Cost and Profit Analysis or Groundnut Farming

The costs of materials required for groundnut farming are listed here. The values presented in this report are just estimation and the real values may change depending on the availability and location of the farm. The materials required for farming in 1 hectare of land for small scale farmers are discussed here. The no. of hours a labourer can work on the field is indicated by mandays. Also it is important to note that male and female labourers have different work capacity and the no. of mandays for each category is different. 1 pair day indicates one and a half day of work.

Rate per manday for men is: Rs 200.

Rate per manday for women is: Rs 175.

Rate per pair day is: Rs 500.

The cost of machine hour is: Rs 650.

Cost of groundnut seeds per kg: Rs 95.

Cost of 1 quintal of manure: Rs 2500.

Cost of 1 kg of nitrogen fertilizer: Rs 62.

Cost of 1 kg of potassium fertilizer: Rs 60.

Cost of 1 kg of phosphorous fertilizer: Rs 55.

Cost of insecticides and pesticides per litre: Rs 600.

Materials and Labour	Investment in Rs
Cost of 103 kg of seeds	15,600.00
Cost of 12.78 quintals of manure	31,950.00
Cost of 12.78 kgs of nitrogen fertilizer	1511.56
Cost of 36.95 kgs of phosphorous fertilizer	2032.25
Cost of 23.87 kgs of potassium fertilizer	1432.20
Irrigation charges for 1 hectare of land	55,000.00
Cost of bullock power @ 3.51 pair days	1755.00
9.21 machine hours for ploughing the land	5986.50
Plant protection chemicals	2000.00
Charges for women labourers for 41.86 mandays	7325.50
Charges for men labourers for 31.96 mandays	6392.00
Cost of 103 kgs of seeds for planting	9785.00
Total investment	1,43,344.00

The produce from 1 hectare of land in quintals is: 17 (approximately).

The cost of 1 kg of groundnuts: Rs 120.

Income from 17 quintals of groundnuts: Rs 2, 04,000.00.

Profit from the farm is: (Rs 2, 04,000.00 – Rs 1, 43,344.00) = Rs 60,656.00 .

Land rental rates, transport charges, electricity charges, post harvest management expenses, marketing costs etc. but these should be included while implementing the farm. Also, there would be some by produce from the farm which is not calculated on the income. Only the basic facilities and their rates have been outlined here and that too for very small scale investors. Sometimes farmers may need fencing, pump houses, labour houses at the farm area; all these would incur extra expenses to the farmers.

Loans and Subsidies for Groundnut Farming

The agriculture development unit of every state has subsidy schemes outlined for various crops with different percentages. It is advisable to visit the nearest agricultural office to know more about these schemes as they keep changing every year.

NABARD is one such organization which provides assistance to farmers in different ways through various subsidy schemes. Please visit the concerned NABARD office of the area or visit their website for more updated information on the subsidies available for farming.

Seed Availability There are certain schemes organized by public sector firms to promote the use of improved varieties of the seed for groundnut farming in India and the schemes are:

Seed village program Beej swavlamban Yojna Contract seed production.

Source: <https://www.agrifarming.in/>

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